22.4

Feasabilty study of BioCart™II in the treatment of symtomatic chronic cartilage defects on the femoral condyle

S. Nehrer[1], C. Chiari[2], H. Barkai[3], A. Yayon[3];
[1]Center For Rgenerative Medicine, Danube University Krems, Krems, Austria, [2]Medical University Of Vienna, Department of Orthopaedics, Vienna, Austria, [3]Prochon Biotech, ProChon Biotech, Rehovot, Israel

Purpose: To evaluate the safety and performance of BioCart™II, a novel scaffold made from fibrin and hyaluronic acid which incorporates autologous chondrocytes, in the treatment of symptomatic chronic cartilage defects of the femoral condyle.
Methods and Materials: 8 patients (7m, 1w) with an average age of 30,4 years suffering from cartilage defects of the medial femoral condyle (average size 4,6cm^2) were included in the study. Cartilage biopsies were taken arthroscopically, the cells were expanded with autologous serum. BioCart™II was implanted after 3 to 6 weeks. The patients were evaluated after 2, 6, 12 weeks, 6 and 12 months.
Results: No serious adverse events occurred. 5 patients developed effusion, which resolved in all cases. The blood parameters were normal, there were no allergic reactions or problems of biocompatibility. After 12 months the subjective IKDC was improved (n.s.). The Lysholm Score was significantly higher 6 and 12 months postoperatively (p=0.0003; p=0.0001). The objective IKDC was significantly improved after 12 months (p=0,0174). MRT Follow-up showed 75 to 100% filling of the defects, no adhesions, minimal implant hypertrophy in 4 patients, an intact cartilage and bone interface in 7 patients and a small subchondral edema in 4 patients.
Conclusions: BioCart™II implantation was tolerated very well in treated patients with no indication for any potential allergic reaction or any impaired biocompatibility. The clinical outcome demonstrated both by MRI and clinical function scoring proved very positive with reduction in pain, improvement in patients‘ morbidity and good filling of the defect with cartilage tissue in all patients.

22.5

Arthroscopic mosaicplasty technique for cartilage knee lesions. Magnetic resonance observation of cartilage repair tissue (MOCART) at a minimum 7 years follow-up.

E. Kon[1], G. Filardo[2], M. Delcogliano[3], S. Zaffagnini[2], C. Montaperto[3], M. Busacca[4], M. Marcacci[5];
[1]Sports Traumatology Dep., Biomechanical Laboratory, Insituti Ortopedici Rizzoli, Bologna, Italy, [2]Orthopaedics Sport Traumatology Department, IOR, Bologna, Italy, [3]Ix Division, Rizzoli Orthopaedic Institute, Bologna, Italy, [4]Radioly, Rizzoli Orthopaedic Institute, Bologna, Italy, [5]Ortopedia E Traumatologia Dello Sport - Laboratorio Di Biomeccanica, Istituti Ortopedici Rizzoli, Bologna, Italy

Purpose: Various approaches have been proposed to treat articular cartilage lesions; nevertheless opinions on indications and clinical efficacy of these techniques are still controversial. In this prospective clinical study our goal is to evaluate mosaicplasty technique for treatment of femoral condyles cartilage lesions at a long term follow up. MRI has become the method of choice for non-invasive follow-up of patients after cartilage repair surgery.
Methods and Materials: Prospective evaluation of 24 cases with full-thickness knee chondral lesions (<2.5 cm^2) treated with arthroscopic mosaicplasty technique. In 19 patients associated procedures were performed, whereas 13 patients had undergone previous surgery. At 7 years follow up ICRS form, Tegner score and MOCART scoring system were used for clinical evaluation.
Results: ICRS objective evaluation showed 76.7% of patients rated good and excellent results at 7 years follow up and the subjective score demonstrated a marked improvement from preoperative to 7 years of follow up. MRI evaluation demonstrated the filling of cartilage defect was still maintained at 7 years in 62.5 % of the patients and the congruency of the articular surface was seen in same patients, complete graft reabsorption with subchondral bone exposure and adjacent bone edema was noted in 1 case (4.1%). The complete integration of the grafted cartilage was detected in 75% of cases, while bone integration was complete in the majority of patients (95.9%).
Conclusions: This arthroscopic one-step surgery appears to be a valid solution for treatment of small grade III-IV cartilage defects. MRI is reliable, reproducibile and accurate tool for assessing cartilage repair tissue.

22.6

Cartilage streaming potentials measured with an arthroscopic medical device correlate with site-specific biochemical and biomechanical properties of equine articular cartilage

M. Garon[1], A. Legare[2], E. Quenneville[2], T.J. Sims[3], A.P. Hollander[4], M.B. Hurtig[5], M.S. Shive[6], M.D. Buschmann[7];
[1]Bio Synech Canada Inc., Laval, Quebec, Canada, [2]Product Development, Bio Syntech Canada Inc., Montreal, Canada, [3]Academic Rheumatology, University of Bristol, Bristol, United Kingdom, [4]Department Of Clinical Science At North Bristol, University of Bristol Academic Rheumatology, Bristol, United Kingdom, [5]Clinical Studies, University of Guelph, Guelph, Canada, [6]Product Development, Bio Syntech Canada Inc., Laval, Canada, [7]Chemical Engineering And Biomedical Engineering, Ecole Polytechnique de Montreal, Montreal, Canada

Purpose: Recently, a medical device (Arthro-BST™, Bio Syntech Canada Inc.) was developed to assess the electromechanical properties of articular cartilage during arthroscopy. The purpose of this study was to compare and correlate streaming potentials obtained using the Arthro-BST™ to the biochemical composition and biomechanical properties of cartilage in a site-specific manner from various equine stifle (knee) joint surfaces.
Methods and Materials: Electromechanical properties were measured manually using the Arthro-BST™, in-vitro, on tibial plateau, femoral condyle and trochlea cartilage surfaces of two equine stifle joints. Full thickness 3mm disks and 6mm rings were then harvested at each measured position. Stress relaxation tests were performed on disks in unconfined compression to obtain equilibrium modulus, fibril modulus and permeability. Then, disks were analyzed for GAG content and rings were analyzed for content of collagen, mature (hydroxylysyl-pyridinoline) and immature (divalent keto-imine) collagen crosslinks.
Results: Streaming potentials from the Arthro-BST™ statistically differentiated the electromechanical properties of the tibial plateau cartilage from those of the trochleas and the femoral condyles. The fibril moduli, collagen content and mature crosslink content were statistically higher for condyles and trochleas compared to tibial plateaus, while the permeability, water content, and immature crosslink content were higher on the tibial plateaus. Streaming potentials correlated with collagen content and mature cross-link content.
Conclusions: The Arthro-BST™ clearly demarcated weaker tibial plateau cartilage from that of condyles and trochleas, suggesting the ability to identify degraded versus healthy cartilage arthroscopically. This instrument could be used to assess cartilage quality during clinical arthroscopic procedures.